SECTION 1012 HANDRAILS

1012.1 Where required. 
Handrails for stairways and ramps shall be adequate in strength and attachment in accordance with Section 1607.8. Handrails required for stairways by Section 1009.15 shall comply with Sections 1012.2 through 1012.9. Handrails required for ramps by Section 1010.9 shall comply with Sections 1012.2 through 1012.8.

1012.2 Height. 
Handrail height, measured above stair tread nosings, or finish surface of ramp slope, shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). Handrail height of alternating tread devices and ship ladders, measured above tread nosings, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

Exceptions:

1. When handrail fittings or bendings are used to provide continuous transition between flights, the fittings or bendings shall be permitted to exceed the maximum height.
2. In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual dwelling units in Group R-2 occupancies; when handrail fittings or bendings are used to provide continuous transition between flights, transition at winder treads, transition from handrail to guard, or when used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.

1012.3 Handrail graspability. 
All required handrails shall comply with Section 1012.3.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies; handrails shall be Type I in accordance with Section 1012.3.1, Type II in accordance with Section 1012.3.2 or shall provide equivalent graspability.

1012.3.1 Type I. 
Handrails with a circular cross section shall have an outside diameter of at least 1\(\frac{1}{4}\) inches (32 mm) and not greater than 2 inches (51 mm). Where the handrail is not circular, it shall have a perimeter dimension of at least 4 inches (102 mm) and not greater than 6\(\frac{1}{4}\) inches (160 mm) with a maximum cross-sectional dimension of 2\(\frac{1}{2}\) inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

1012.3.2 Type II. 
Handrails with a perimeter greater than 6\(\frac{1}{4}\) inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 2\(\frac{1}{4}\) inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of at least 3\(\frac{1}{16}\) inch (8 mm) within 3\(\frac{3}{8}\) inch (22 mm) below the widest portion of the profile. This required depth shall continue for at least 3\(\frac{3}{8}\) inch (10 mm) to a level that is not less than 1\(\frac{3}{4}\) inches (45 mm) below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1\(\frac{1}{4}\) inches (32 mm) to a maximum of 2\(\frac{3}{4}\) inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

1012.4 Continuity. 
Handrail gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.
Exceptions:

1. **Handrails** within **dwelling units** are permitted to be interrupted by a newel post at a turn or landing.
2. Within a **dwelling unit**, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. Handrail brackets or balusters attached to the bottom surface of the **handrail** that do not project horizontally beyond the sides of the **handrail** within 1\(\frac{1}{2}\) inches (38 mm) of the bottom of the **handrail** shall not be considered obstructions. For each 1\(\frac{1}{2}\) inch (12.7 mm) of additional **handrail** perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of 1\(\frac{1}{2}\) inches (38 mm) shall be permitted to be reduced by 1\(\frac{1}{8}\) inch (3 mm).
4. Where **handrails** are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.

**1012.5 Fittings.**
*Handrails* shall not rotate within their fittings.

**1012.6 Handrail extensions.**
**Handrails** shall return to a wall, guard or the walking surface or shall be continuous to the **handrail** of an adjacent **stair flight** or **ramp** run. Where **handrails** are not continuous between **flights**, the **handrails** shall extend horizontally at least 12 inches (305 mm) beyond the top riser and continue to slope for the depth of one tread beyond the bottom riser. At **ramps** where **handrails** are not continuous between runs, the **handrails** shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of **ramp** runs. The extensions of **handrails** shall be in the same direction of the **stair flights** at **stairways** and the **ramp** runs at **ramps**.

Exceptions:

1. **Handrails** within a **dwelling unit** that is not required to be accessible need extend only from the top riser to the bottom riser.
2. **Aisle handrails** in rooms or spaces used for assembly purposes in accordance with Section 1028.13.
3. **Handrails** for **alternating tread devices** and ship ladders are permitted to terminate at a location vertically above the top and bottom risers. **Handrails** for **alternating tread devices** and ship ladders are not required to be continuous between **flights** or to extend beyond the top or bottom risers.

**1012.7 Clearance.**
Clear space between a **handrail** and a wall or other surface shall be a minimum of 1\(\frac{1}{2}\) inches (38 mm). A **handrail** and a wall or other surface adjacent to the **handrail** shall be free of any sharp or abrasive elements.

**1012.8 Projections.**
On **ramps**, the clear width between **handrails** shall be 36 inches (914 mm) minimum. Projections into the required width of **stairways** and **ramps** at each side shall not exceed 4\(\frac{1}{2}\) inches (114 mm) at or below the **handrail** height. Projections into the required width shall not be limited above the minimum headroom height required in Section 1009.5. Projections due to intermediate **handrails** shall not constitute a reduction in the egress width.

**1012.9 Intermediate handrails.**
**Stairways** shall have intermediate **handrails** located in such a manner that all portions of
the stairway width required for egress capacity are within 30 inches (762 mm) of a handrail. On monumental stairs, handrails shall be located along the most direct path of egress travel.

SECTION 1013 GUARDS

1013.1 General.
Guards shall comply with the provisions of Sections 1013.2 through 1013.7. Operable windows with sills located more than 72 inches (1.83 m) above finished grade or other surface below shall comply with Section 1013.8.

1013.2 Where required.
Guards shall be located along open-sided walking surfaces, including mezzanines, equipment platforms, stairs, ramps and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Guards shall be adequate in strength and attachment in accordance with Section 1607.8.

Exception: Guards are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including steps leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, ramps and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.
7. In assembly seating where guards in accordance with Section 1028.14 are permitted and provided.

1013.2.1 Glazing.
Where glass is used to provide a guard or as a portion of the guard system, the guard shall also comply with Section 2407. Where the glazing provided does not
meets the strength and attachment requirements of Section 1607.8, complying guards shall also be located along glazed sides of open-sided walking surfaces.

1013.3 Height.
Required guards shall not be less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces;
2. On stairs, from the line connecting the leading edges of the tread nosings; and
3. On ramps, from the ramp surface at the guard.

Exceptions:
1. For occupancies in Group R-3 not more than three stories above grade in height and within individual dwelling units in occupancies in Group R-2 not more than three stories above grade in height with separate means of egress, required guards shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces or adjacent fixed seating.
2. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
3. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the leading edges of the treads.
4. The guard height in assembly seating areas shall comply with Section 1028.14.
5. Along alternating tread devices and ship ladders, guards whose top rail also serves as a handrail, shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from the leading edge of the device tread nosing.

1013.4 Opening limitations.
Required guards shall not have openings which allow passage of a sphere 4 inches (102 mm) in diameter from the walking surface to the required guard height.

Exceptions:
1. From a height of 36 inches (914 mm) to 42 inches (1067 mm), guards shall not have openings which allow passage of a sphere 4 3/8 inches (111 mm) in diameter.
2. The triangular openings at the open sides of a stair, formed by the riser, tread and bottom rail shall not allow passage of a sphere 6 inches (152 mm) in diameter.
3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, guards shall not have openings which allow passage of a sphere 21 inches (533 mm) in diameter.
4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for alternating tread devices and ship ladders, guards shall not have openings which allow passage of a sphere 21 inches (533 mm) in diameter.
5. In assembly seating areas, guards at the end of aisles where they terminate at a fascia of boxes, balconies and galleries shall not have openings which allow passage of a sphere 4 inches in diameter (102 mm) up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, guards shall not have openings which allow passage of a sphere 8 inches (203 mm) in diameter.
6. Within individual dwelling units and sleeping units in Group R-2 and R-3 occupancies, guards on the open sides of stairs shall not have openings which allow passage of a sphere 4 3/8 (111 mm) inches in diameter.

1013.5 Screen porches.
Porches and decks which are enclosed with insect screening shall be provided
with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

1013.6 Mechanical equipment.
Guards shall be provided where appliances, equipment, fans, roof hatch openings or other components that require service are located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The guard shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter. The guard shall extend not less than 30 inches (762 mm) beyond each end of such appliance, equipment, fan or component.

1013.7 Roof access.
Guards shall be provided where the roof hatch opening is located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The guard shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

1013.8 Window sills.
In Occupancy Groups R-2 and R-3, one- and two-family and multiple-family dwellings, where the opening of the sill portion of an operable window is located more than 72 inches (1829 mm) above the finished grade or other surface below, the lowest part of the clear opening of the window shall be at a height not less than 36 inches (915 mm) above the finished floor surface of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4-inch-diameter (102 mm) sphere where such openings are located within 36 inches (915 mm) of the finished floor.

Exceptions:

1. Operable windows where the sill portion of the opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below and that are provided with window fall prevention devices that comply with ASTM F 2006.
2. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the window is in its largest opened position.
3. Openings that are provided with window fall prevention devices that comply with ASTM F 2090.
4. Windows that are provided with window opening control devices that comply with Section 1013.8.1.

1013.8.1 Window opening control devices.
Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1029.2.